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VOLENTINE & WHITT PLLC ONE FREEDOM SQUARE 11951 FREEDOM DRIVE SUITE 1260 RESTON, VA 20190				
EXAMINER				
KALAM, ABUL				
ART UNIT		PAPER NUMBER		
2814				
NOTIFICATION DATE		DELIVERY MODE		
07/21/2010		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

09/313,659

Applicant(s)

YANG ET AL.

Examiner

Abul Kalam

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 September 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 May 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/02)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

DETAILED ACTION

Status of Application

1. The petition filed on August 28, 2007, to invoke supervisory authority is hereby treated as a request for reconsideration. Upon Applicant's request, the instant application was assigned to a new examiner. Furthermore, note that in the petition decision mailed on July 8, 2005, the Notice of Abandonment made by the previous examiner was vacated and the application was restored to pending status. To clarify the record, the Examiner's Amendments, and the comments made therein, on April 11, 2001, and on August 03, 2001, were vacated. The Notice of Allowance mailed on April 11, 2001, was also vacated and the indicated allowance of claims was withdrawn.

Currently, claims 1-19 are pending in the application.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is indefinite for the following reasons: In lines 12-13 of claim 1, the limitation of "implanting second impurity ions of a low concentration into a second portion of the semiconductor substrate adjacent to the first gate and first gate spacers," is ambiguous and indefinite because the limitation of "first gate spacers" is unclear. Note, line 11 of the claim states: "forming first gate spacers on lateral sides of the first,

second, and third gates." Thus, it is unclear if the recitation of "first gate spacers," in line 13 of the claim, is referring to the first gate spacers on the lateral sides of the first gate, second gate, and/or third gate. For examination purposes, the limitation will be interpreted as "first gate spacers on the lateral sides of the first gate."

Claims 2-14 depend from claim 1, and thus, are also rejected for the same reasons.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 15-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ahmad et al. (US 5,849,615; hereinafter, Aftab) in view of Yokozeki (US 6,066,894).

Regarding claim 15, Ahmad discloses a method for fabricating a MOS transistor in a semiconductor device (Figs. 1-7), the method comprising the steps of:

- forming a gate electrode (20, Fig. 1) over a semiconductor substrate (10);
- implanting first impurity ions (40, Fig. 2) at a low concentration of a first conductivity type (col. 4: lines 1-13), using the gate electrode (20) as a mask, to form a first impurity diffusion layer (42);

- forming first spacers (45, Fig. 3) on lateral sides of the gate (20);
- implanting second impurity ions (46, Fig. 4) at a low concentration of a second conductivity type (col. 4: lines 40-49), using the gate (20) and first spacers (45) as a mask, to form a second impurity diffusion layer (50, Fig. 4); and

- forming a second spacers (52, Fig. 5) adjacent to the first spacers (45);
- implanting third impurity ions (68, Fig. 7) of high concentration of a second conductivity type (col. 5: lines 29-35), using the gate (20) and the first and second spacers (45 and 52) as a mask, to form a third impurity diffusion layer (70, Fig. 7);

- wherein the first diffusion layer (42) overlaps the second diffusion layer (50, (Fig. 4);

However, Ahmad does not explicitly disclose annealing and diffusing the impurity diffusion layers to overlap the first diffusion layer with the second diffusion layer.

However, Yokozeki discloses a method for fabricating a MOS transistor in a semiconductor device (Figs. 5A-5L), including a step of annealing and diffusing (col. 12: lines 3-11) the impurity diffusion layers to overlap the first diffusion layer (10, Fig. 5E) with the second diffusion layer (16). Annealing and diffusing impurity diffusion layers is

well known and conventionally used in the semiconductor art to form source/drain regions with graded concentration, for the purpose of improving device characteristics. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention, to incorporate the teaching of Yokozeki into the invention of Ahmad, to anneal and diffuse the impurity diffusion layers such that they overlap one another, for the purpose of forming graded source/drain regions with improved device characteristics.

Regarding claim 16, Ahmad discloses wherein the first conductivity type is n-type (col. 4: lines 1-5).

Regarding claim 17, Ahmad discloses wherein the implanting of first impurity ions (40, Fig. 2) is performed using arsenic with a dose range of about 5×10^{12} ions/cm² to about 5×10^{13} ions/cm² and at an energy range of about 10 KeV to about 100 KeV (col. 4: lines 10-13). Thus, Ahmad discloses all the limitations of the claim with the exception of disclosing a specific dose range of about 5×10^{12} ions/cm² and a specific energy range of about 50 KeV. However, such a claimed range for the dose and energy level of the implantation would have been obvious to one of ordinary skill in the art, at the time of the invention, since it has been held that where the general conditions a claim are disclosed in the prior art, it is not inventive to discover optimum or workable ranges by routine experimentation. *In re Aller*, 220 F.2d 454, 105 USPQ 233, 234 (CCPA 1955). Furthermore, where patentability is said to be based upon particular chosen range or dimension recited in a claim, the Applicant must show that the chosen range or dimension is critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Regarding claim 18, Ahmad discloses wherein the implanting of second impurity ions (46, Fig. 4) is performed using boron with a dose range of about 5×10^{12} ions/cm² to about 5×10^{13} ions/cm² and at an energy range of about 10 KeV to about 100 KeV (col. 4: lines 45-49). Thus, Ahmad discloses all the limitations of the claim with the exception of disclosing a specific dose range of about 1×10^{13} ions/cm² and a specific energy range of about 20 KeV. However, such a claimed range for the dose and energy level of the implantation would have been obvious to one of ordinary skill in the art, since it has been held that where the general conditions a claim are disclosed in the prior art, it is not inventive to discover optimum or workable ranges by routine experimentation. *In re Aller*, 220 F.2d 454, 105 USPQ 233, 234 (CCPA 1955). Furthermore, where patentability is said to based upon particular chosen range or dimension recited in a claim, the Applicant must show that the chosen range or dimension is critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Regarding claim 19, Ahmad discloses wherein the implanting of third impurity ions (68, Fig. 7) is performed using BF₂ with a dose range of about 1×10^{15} ions/cm² to about 5×10^{15} ions/cm² and at an energy range of about 10 KeV to about 40KeV (col. 5: lines 32-35). Thus, Ahmad discloses all the limitations of the claim with the exception of disclosing a specific dose range of about 5×10^{15} ions/cm² and a specific energy range of about 20 KeV. However, such a claimed range for the dose and energy level of the implantation would have been obvious to one of ordinary skill in the art, since it has been held that where the general conditions a claim are disclosed in the prior art, it is not inventive to discover optimum or workable ranges by routine experimentation. *In re*

Aller, 220 F.2d 454, 105 USPQ 233, 234 (CCPA 1955). Furthermore, where patentability is said to be based upon a particular chosen range or dimension recited in a claim, the Applicant must show that the chosen range or dimension is critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Allowable Subject Matter

4. Claims 1-14 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Abul Kalam whose telephone number is (571)272-8346. The examiner can normally be reached on Monday - Friday, 9 AM - 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business

Art Unit: 2814

Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. K./

Examiner, Art Unit 2814

/Wael M Fahmy/

Supervisory Patent Examiner, Art
Unit 2814